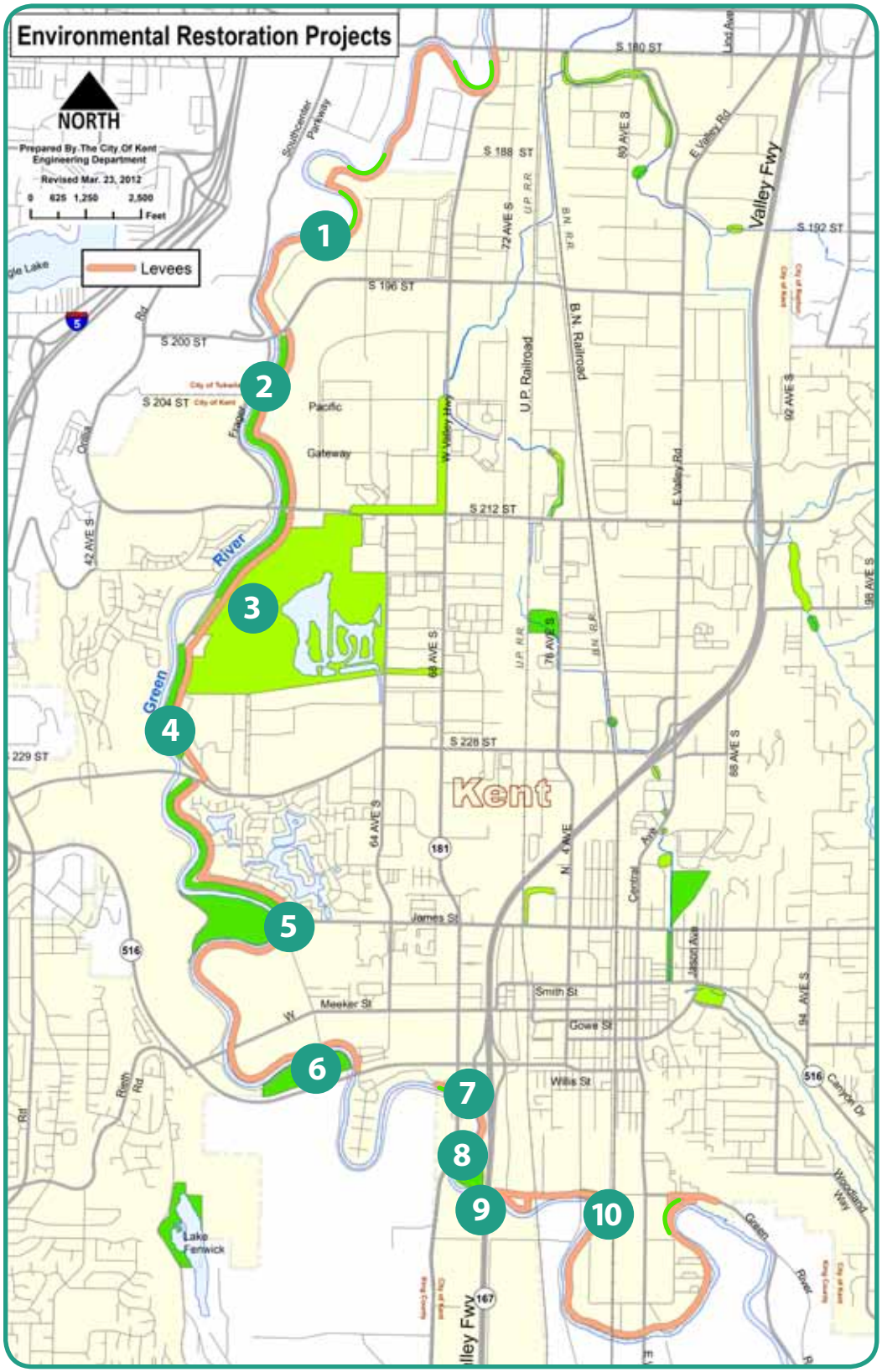
GREEN RIVER PROJECTS

Achieving Flood Protection, Habitat Restoration and Economic Sustainability

Updated 4-27-12

PROJECT LOCATIONS

1. **Briscoe/Desimone** Levee
2. **Boeing** Levee
3. **Green River** Natural Resources Area
4. **Lower/Lowest Russell Road** Levee
5. **SR 516 to S. 231st Way** Levee
6. **Downey** Farmstead Restoration
7. **Hawley Road** Levee
8. **Riverview Park**
9. **Leber** Homestead
10. **Horseshoe Bend** Levee



WHAT KENT IS DOING

The City of Kent is committed to protecting residents and businesses from flooding, preserving open spaces, restoring natural habitat, and promoting a healthy vibrant economy along the Green River:

Adding Woody Debris for Salmon Protection

Woody debris includes anchored tree trunks and roots that increase the complexity of the stream channel. Water flowing through and around wood creates pools and provides protected areas for salmon and their prey. Large woody debris also provides a layer of protection for riverbanks during high river flows.

Adding Shelves or Benches for Wildlife Habitat

Referred to as benches, shelves, or terraces, these shallow areas found on riverbank side slopes provide habitat for fish, birds, and other wildlife. A healthier plant community also exists along terraced riverbanks as varying water levels in a river are able to support diverse plant species. In addition, benches or shelves parallel to the riverbank help stabilize the riverbank side slopes and provide a wider channel for flood water storage and conveyance, which reduces the risk of flooding during storm events.

Planting Native Trees and Shrubs

Native trees and shrubs provide shade to the river, which lowers water temperatures and provides habitat for fish. During high flow events in the river, tree roots help stabilize the river bank soils. Along urban riverbanks, native plants are often dominated by invasive and aggressive plants such as Himalayan blackberries, reed canary grass, and Japanese knotweed. These invasive plants provide little to no benefit for the river or the fish that utilize the river system. Our projects include native plantings along the riverbank.

Levee Projects for Flood Protection

Our short term objective is to gain FEMA accreditation of our levees. We are constructing, modifying and maintaining both primary and secondary levees to reach this goal. Primary levees are the existing riverbanks, and are the first line of protection against flooding. Secondary levees are walls and berms that are placed behind the existing riverbank, providing an additional layer of safety. These improvements reduce flood risk for our citizens and protect the local economy of the Kent valley. The long term goal is providing flood protection to a 500-year flood level.

GREEN RIVER PROJECTS

BRISCOE/DESIMONE LEVEE

Briscoe/Desimone Project Description:

The Briscoe/Desimone Levee is located along the east bank of the Green River between S. 200th St. and S. 180th St., and protects portions of Kent, Tukwila, and Renton from flooding. This levee project is focused on continuing to protect manufacturing, warehousing, and aerospace industries clustered in the Green River Valley.

Failure of the Briscoe/Desimone Levee could inundate an area of the Green River valley extending from S. 228th St. in Kent northerly to Interstate 405 in Renton. Approximately 18,400 jobs are located within the affected area, and an additional 2,600 jobs are forecast to be added in this area by 2030. Recognizing the need for job creation and preservation, the state legislature recently approved a $7 million grant for improvements to the Briscoe/ Desimone Levee.

Several sections of this levee reach require the construction of a levee wall where additional property is not available. Levee walls have been used successfully all over the world and have been accredited by FEMA to protect against severe flood events. This wall would be less than 2 feet thick, and can be built within the existing right-of-way. These features reduce the cost to the city, and allow for a shortened construction schedule.

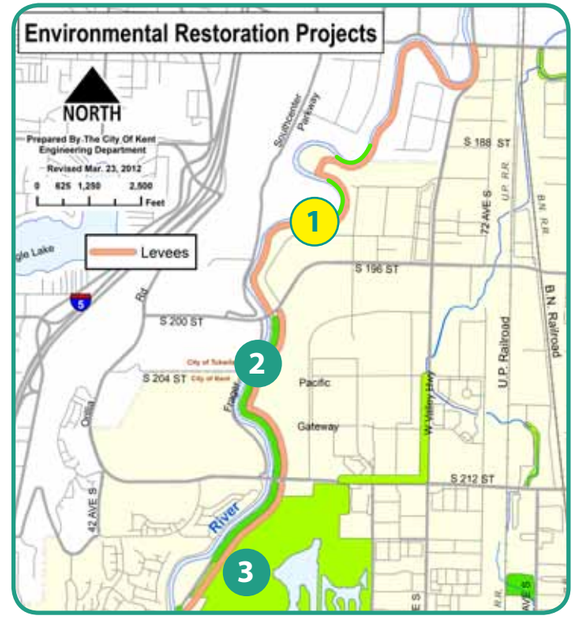
As a future project, the proposed levee wall does not preclude work along the river's edge to improve riparian habitat. Invasive plants will be replaced by native trees and shrubs to help shade the river and provide cooler water temperatures. Large woody debris will also be installed along the river's edge to slow down river flows and provide important habitat for salmon in the Green River.

The Briscoe/Desimone levee demonstrates that even with existing developments located closely behind the levee, improvements to the levee can be achieved without an impact to warehouses and future improvements can also be completed to improve salmon habitat.

1. **Briscoe/Desimone** Levee

2. **Boeing** Levee

3. **Green River** Natural Resources Area



BRISCOE/DESIMONE LEVEE

The Briscoe/Desimone Levee protects one of the most highly developed industrial and commercial areas in the cities of Kent and Tukwila and reduces flood risk for the city of Renton.

Kent has proposed flood walls in limited areas to provide flood protection. Future projects located on the river side of the floodwall will improve existing habitat.

1. Flood protection wall **2**. Native trees and shrubs

GREEN RIVER PROJECTS

BOEING LEVEE

Boeing Levee Project Description:

The Boeing Levee was constructed on lands that were deeded to the City of Kent by the Boeing Company. The levee reach spans between S. 200th St. and S. 212th St., and is located on the east side of the Green River. The downstream end of the levee system ties into the roadway embankment of South 200th Street, while the upstream end of the levee system ties into the roadway embankment of South 212th Street. The city's Three Friends Fishing Hole Park, the Green River Trail, and the wide area between the levee and the Green River are some of the key physical features of a project indicative of where the city is achieving both flood protection and habitat restoration.

Prior to 2000, the Boeing Levee was located along the Russell Road right-of-way which was immediately adjacent to the top of the right bank of the Green River. In late-August through mid-November of 2000, the Green River Flood Control District, now presently known as the King County Flood Control District, oversaw and funded a project that removed the levee from the top of bank location and re-constructed the levee as a setback levee.

The City's project in 2012 is to construct a secondary levee and a floodwall at the downstream reach of the levee, located near S. 200th Street and the city's Three Friends Fishing Hole Park. The secondary levee will be an earthen embankment and the floodwall will have an aesthetic wall treatment which celebrates the ecology of the Green River. The improvements to be completed in 2012, together with the improvements completed by the District in 2000, will certify this levee reach to protect against the 1% annual flood. This level of protection is the standard for a FEMA accredited levee. This project is funded by a grant from the State of Washington.

Since a majority of the levee is setback from the top of bank, there is a wide, relatively unvegetated floodplain on the riverward side of the levee. This presents a tremendous opportunity to improve riparian habitat and restore floodplain functions along this reach of the Green River. As such, the City of Kent has partnered with the US Army Corps of Engineers to design an ecosystem restoration project which will benefit salmon species in the river. This upcoming restoration project at the Boeing Levee presents one of the best examples of all the levee reaches, where the city is accomplishing both flood protection and habitat restoration.

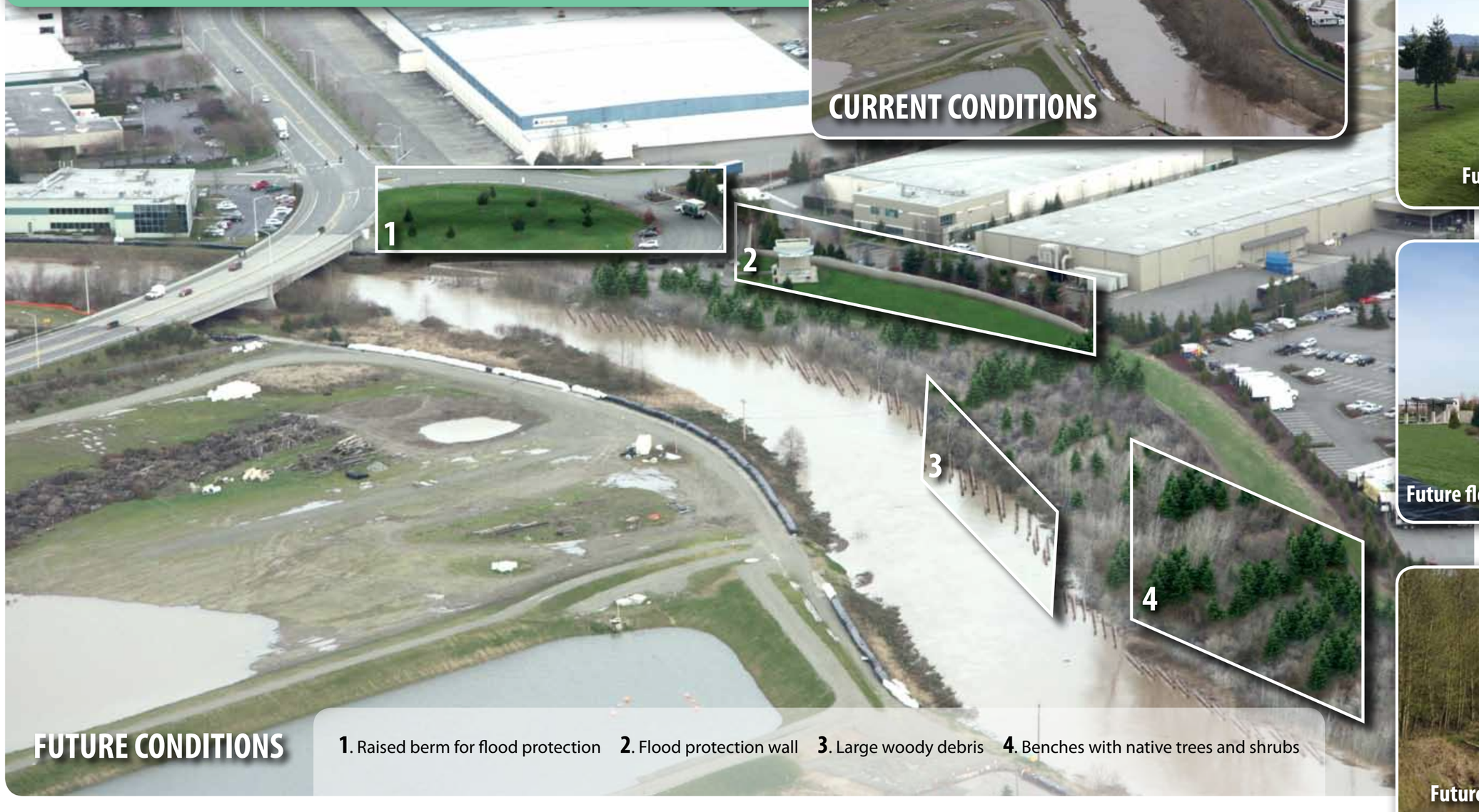
1. **Briscoe/Desimone** Levee

2. **Boeing** Levee

3. **Green River** Natural Resources Area

BOEING LEVEE

Construction of an earthen levee and flood wall will begin in 2012 *(Fig. 1, 2)*. Additionally, the city will partner with the Army Corps of Engineers to enhance fish and wildlife habitat by restoring 16 acres of riparian area with native plantings and large woody debris *(Fig. 3, 4)*. This project is adjacent to the city's Three Friends Fishing Hole Park.




Future raised berm (Fig. 1)


Future flood protection wall (Fig. 2)


Future bench with native trees and shrubs (Fig. 4)

GREEN RIVER PROJECTS

GREEN RIVER NATURAL RESOURCES AREA

Green River Natural Resources Area Project Description:

The Green River Natural Resources Area (GRNRA) is located in the northwestern portion of the Kent Valley. Constructed by the City of Kent in 1996, this project converted an abandoned sewage lagoon system into a combined stormwater detention and enhanced wetland facility. Rather than develop the land to build the city's tax base, Kent took the 304 acre site and incorporated state of the art techniques of wetland creation, enhancement, and urban wildlife management. The GRNRA is one of the largest man-made, multi-use wildlife refuges in the United States.

The lagoons and wetlands at the GRNRA offer increased flood protection by providing sufficient storage to reduce flows in the lower portion of Mill Creek while simultaneously serving as a nesting, feeding, and brooding area for many species using the Green River corridor as a travel route.

With its nature walks, wildlife viewing towers, and a bike path along the west and south sides of the site, the GRNRA provides extensive recreational as well as educational opportunities. The facility also provides ongoing opportunities for hands-on involvement in the management and maintenance of the facility. For example, volunteers have built and installed bird boxes, planted native plant species, and completed bird counts.

A five-acre native plant nursery on the southwestern corner of the site propagates thousands of native plants for placement within the GRNRA and other natural areas within the city, provides a home for plant salvaging projects, and serves as an education and training facility for area youth and volunteers. To date, over 200,000 native plants have been grown at the nursery and planted throughout Kent.

As a future project, the City has looked to partner with the other agencies to develop a watershed center at the site. The GRNRA Watershed Center would be a place where the public can learn about our natural resources and the importance of water conservation, preservation and protection and its connection to salmon habitat and wildlife. Located within the GRNRA, the watershed center would be a focal point for the community's involvement and education on the Green River and would be consistent with the city's commitment to environmental conservation and habitat restoration.

2. Boeing Levee

3 Green River Natural Resources Area

4. Lower/Lowest Russell Road Levee

GREEN RIVER
NATURAL RESOURCES AREA

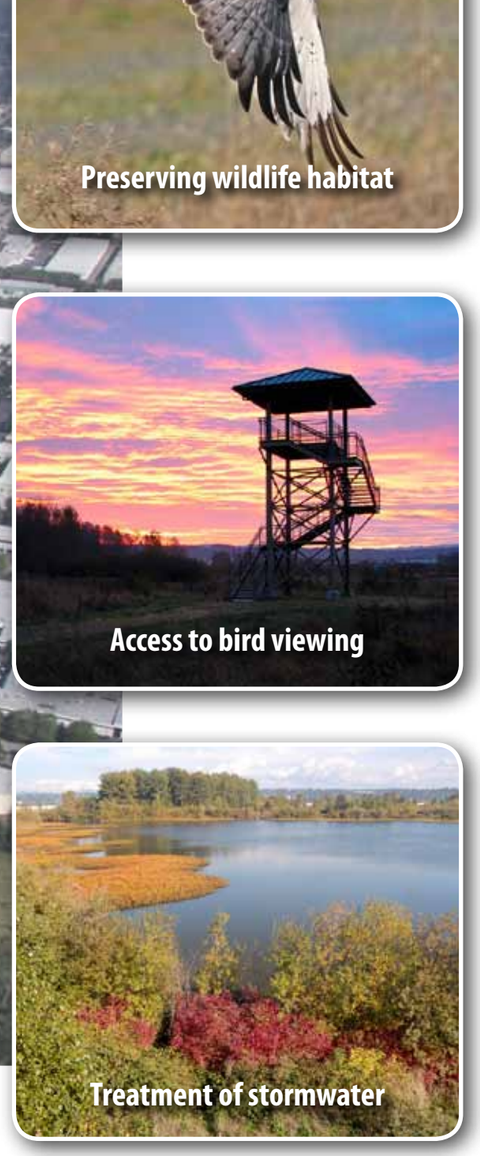
The site, formerly an abandoned sewage lagoon system, was transformed by the City of Kent Public Works Department into a combined stormwater treatment and enhanced wetland facility.

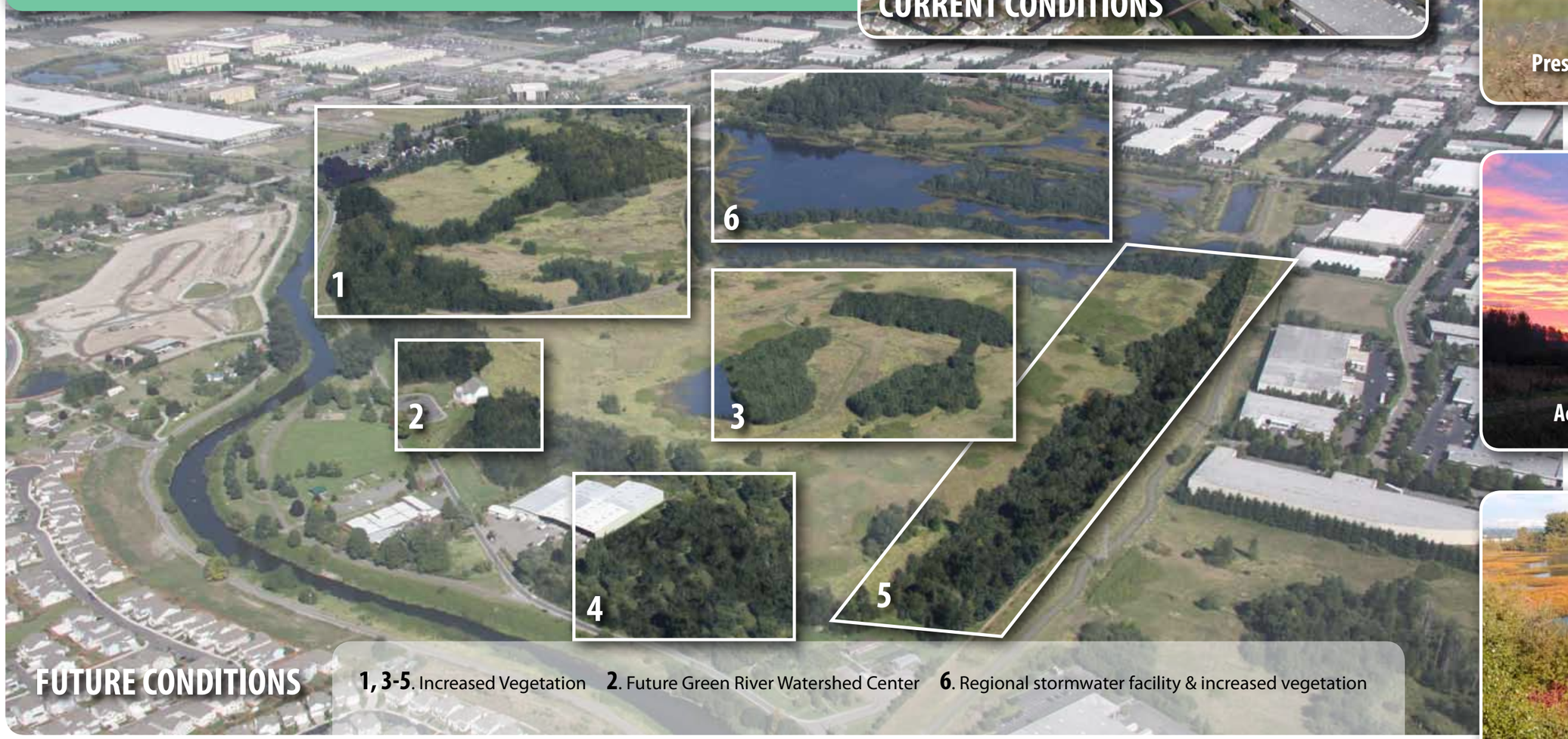
The Green River Natural Resources Area (GRNRA) is one of the largest man-made, multi-use wildlife refuges in the United States. Set on 310 acres alongside the Green River, the GRNRA is home to 165 different birds, 53 unique mammals, and provides nesting, feeding, and brooding habitat to countless migrating species.


CURRENT CONDITIONS


Preserving wildlife habitat

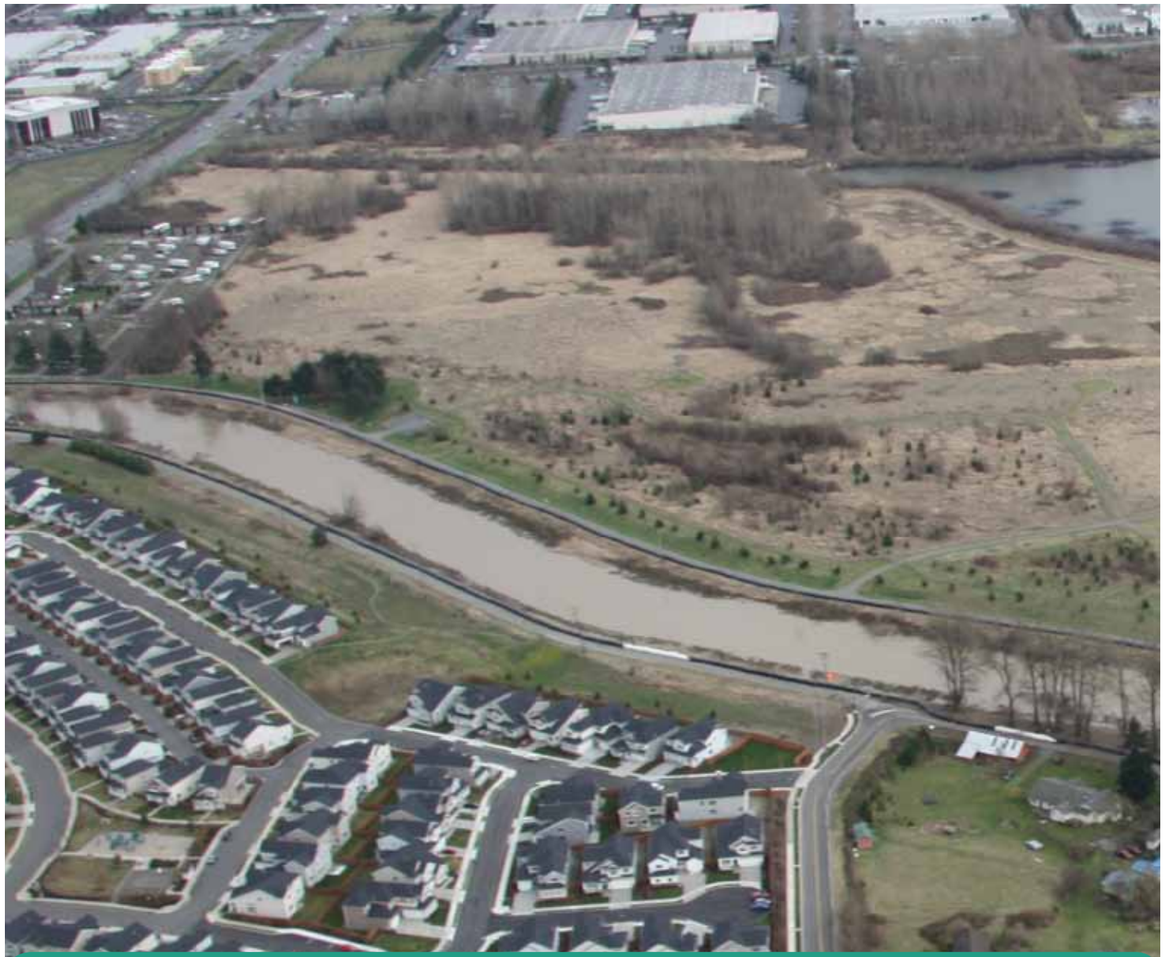
Access to bird viewing


Treatment of stormwater



FUTURE CONDITIONS

1, 3-5. Increased Vegetation **2**. Future Green River Watershed Center **6**. Regional stormwater facility & increased vegetation



GREEN RIVER PROJECTS

LOWER/LOWEST RUSSELL ROAD LEVEE

Lower/Lowest Russell Road Project Description:

The Lower/Lowest Russell Road levee, which lies between S. 231st Way and S. 212th St., spans nearly 1.5 miles. This project connects the Boeing levee with the SR 516 to S. 231st Way levee, providing flood protection to nearly two thirds of the City, and an excellent opportunity to restore a significant amount of habitat.

The secondary levee will be placed adjacent to the roadway in most areas. In some areas the roadway will be raised to act as the levee, and in some places the City will be utilizing existing berms that were constructed as part of the Green River Natural Resources Area.

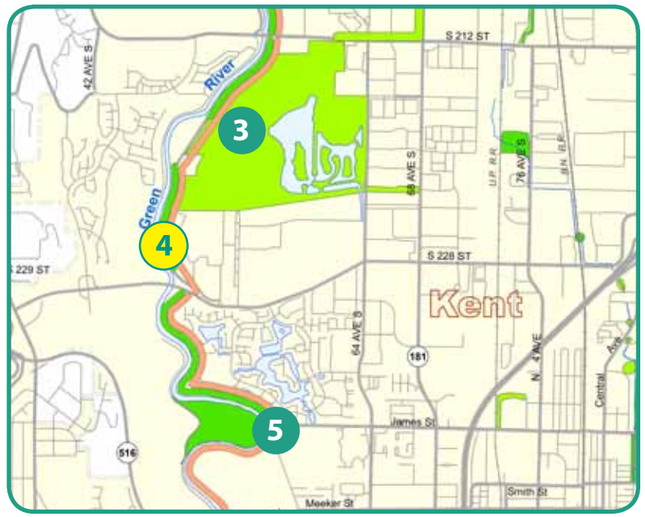
Secondary levees are beneficial for a couple reasons. They provide additional flood protection without the need to rebuild the existing levee, and they present one of the best opportunities for restoration of natural habitat by increasing the amount of available area.

The long term project plan involves moving Russell Road away from the river and placing it on top of the setback levee.

3. Green River Natural Resources Area

4 Lower/Lowest Russell Road Levee

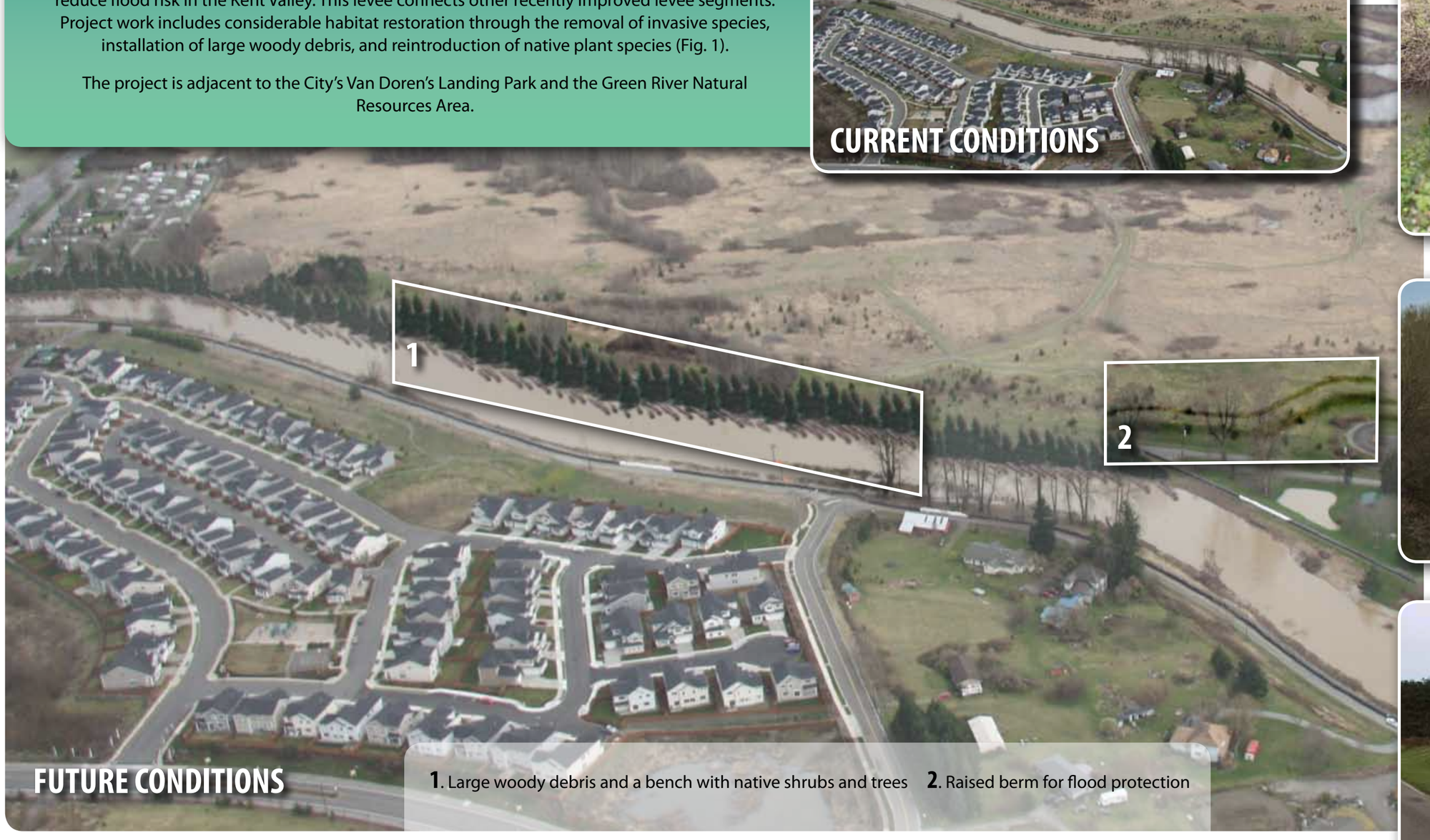
5. SR 516 to S. 231st Way Levee



LOWER/LOWEST
RUSSELL ROAD LEVEE

For nearly the entire 1.5 mile reach of this river segment, secondary levees are proposed to reduce flood risk in the Kent Valley. This levee connects other recently improved levee segments. Project work includes considerable habitat restoration through the removal of invasive species, installation of large woody debris, and reintroduction of native plant species (Fig. 1).

The project is adjacent to the City's Van Doren's Landing Park and the Green River Natural Resources Area.



1. Large woody debris and a bench with native shrubs and trees **2**. Raised berm for flood protection


Large woody debris


Bench with native plantings


Raised berm for flood protection

GREEN RIVER PROJECTS

SR 516 TO S. 231ST WAY LEVEE

SR 516 to S. 231st Way Project Description:

Located along the east side of the Green River, the SR 516 to S. 231st Way levee connects to other recently improved levee segments. Together, these levees can prevent flooding in approximately two-thirds of the Kent Valley. The SR 516 to S. 231st Way Levee is part of a larger effort to have the entire levee system within the city limits accredited by FEMA. Accreditation of this levee will remove areas behind the levee from FEMA flood maps which will reduce development restrictions and FEMA flood insurance requirements in the Kent Valley.

Secondary levees will be constructed in areas where improvements are needed for levee accreditation. These levee segments will be near existing housing developments. The new segments will be designed with terraced benches for native plantings, while setback levees will be built to offer increased flood protection and additional space for habitat restoration along the river.

4. **Lower/Lowest Russell Road** Levee

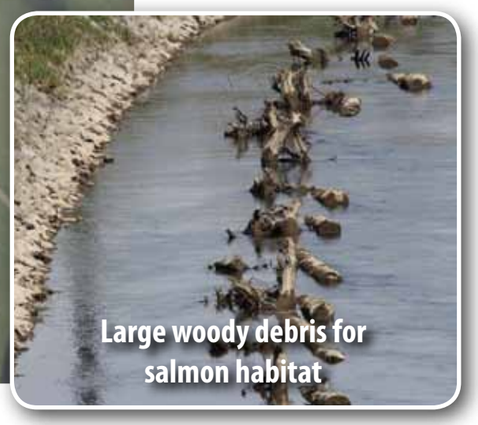
5. **SR 516 to S. 231st Way** Levee

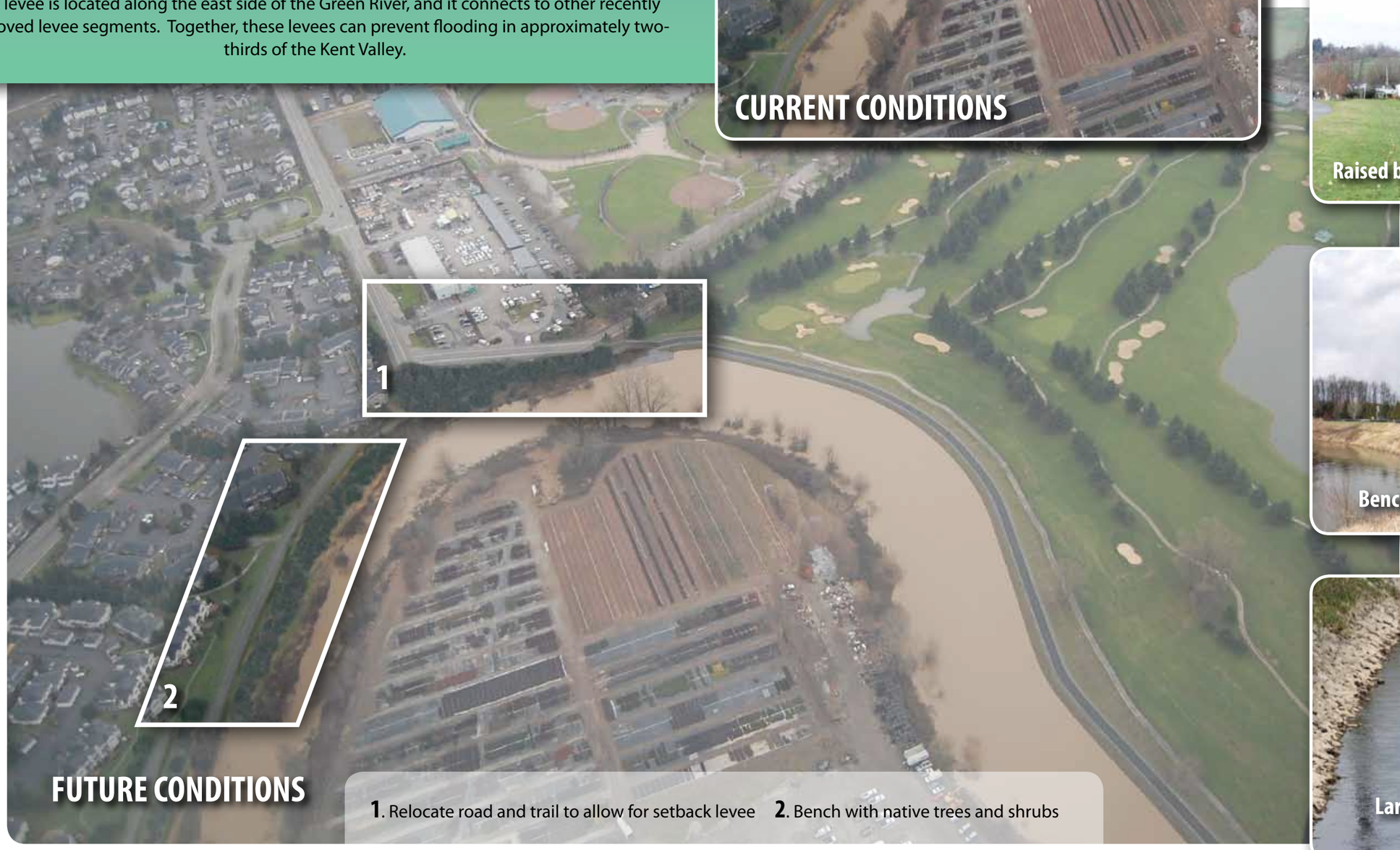
6. **Downey** Farmstead Restoration

SR 516 TO S. 231ST WAY
LEVEE

Near the Riverbend Golf Complex, this levee reach protects one of the City's largest private residential communities of nearly 6,000 Kent citizens.

This levee is located along the east side of the Green River, and it connects to other recently improved levee segments. Together, these levees can prevent flooding in approximately two-thirds of the Kent Valley.





1. Relocate road and trail to allow for setback levee **2**. Bench with native trees and shrubs

GREEN RIVER PROJECTS

DOWNEY FARMSTEAD

Downey Farmstead Project Description:

The Downey Farmstead project has received funding from the Washington State Recreation and Conservation Salmon Recovery Funding Board and the King Conservation District for final design and permitting. The project will work to balance flooding, fish and farming objectives in an area that has been identified as critical to increase survival of juvenile Chinook salmon.

The project site was first homesteaded by Irish immigrant Patrick Downey in 1863, who grew hops, hay, and grain as well as dairying. The Downey heirs retained ownership of the site until the late 1990's – 2000's. Final design will include relocation of Frager Road near the north side of State Route 516 to allow creation of a side channel network and expanded floodplain at the site on the south bank of the Green River. The road realignment will provide a greater buffer from the river and will continue to be open to cars, bicycles and pedestrians.

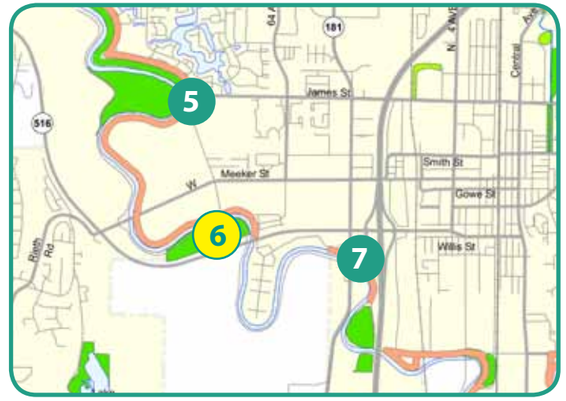
The project area is currently vacant and undeveloped. Most of the site is overgrown with dense invasive vegetation such as blackberries. Invasive, non-native vegetation will be removed and replaced with native vegetation in addition to installation of large woody structures in the side channels to form scour holes and pools to add habitat diversity, cover and refuge.

The goal of the project is to create habitat for Chinook and other salmon species to rear, rest and hide from predators. A secondary goal is to create additional flood storage to help alleviate flooding in urban and agricultural areas.

5. SR 516 to S. 231st Way Levee

6 **Downey** Farmstead Restoration

7. Hawley Road Levee



DOWNEY FARMSTEAD

Final design of this project enhances river habitat by providing an additional 22 acres of floodplain storage, side channel salmon rearing, and bird refuge area. This restoration provides flood reduction benefits to downstream and upstream properties and farms in the Agricultural Production District.


CURRENT CONDITIONS


Bench for native plantings


1


3


2


Enhanced salmon habitat


Increased flood protection for Agricultural District

FUTURE CONDITIONS

1. Slow-moving channels for salmon **2**. Native shrubs and trees **3**. Frager road relocated away from river

GREEN RIVER PROJECTS

HAWLEY ROAD LEVEE

Hawley Road Project Description:

The Hawley Road Levee is about a 1/4 mile long, and located along the east bank of the Green River just west of SR 167 and north of Riverview Park. As part of Kent's 12 mile long levee system, the Hawley Road Levee provides flood protection to countless businesses, homes, and infrastructure in the valley.

In addition to providing increased safety to local residents, this levee section is designed with an earthen berm levee to have the least impact on the environment. In order to meet the Corps of Engineers' federal standards the riverbank may be enhanced with smaller shrubs and trees. Large woody debris will be installed to slow the river and provide additional habitat for fish and wildlife.

The levee is being built to achieve FEMA accreditation in the most cost effective way possible. It is made feasible with 3/4 of the funding coming from a grant from the state through an interlocal agreement with the King County Flood Control District.

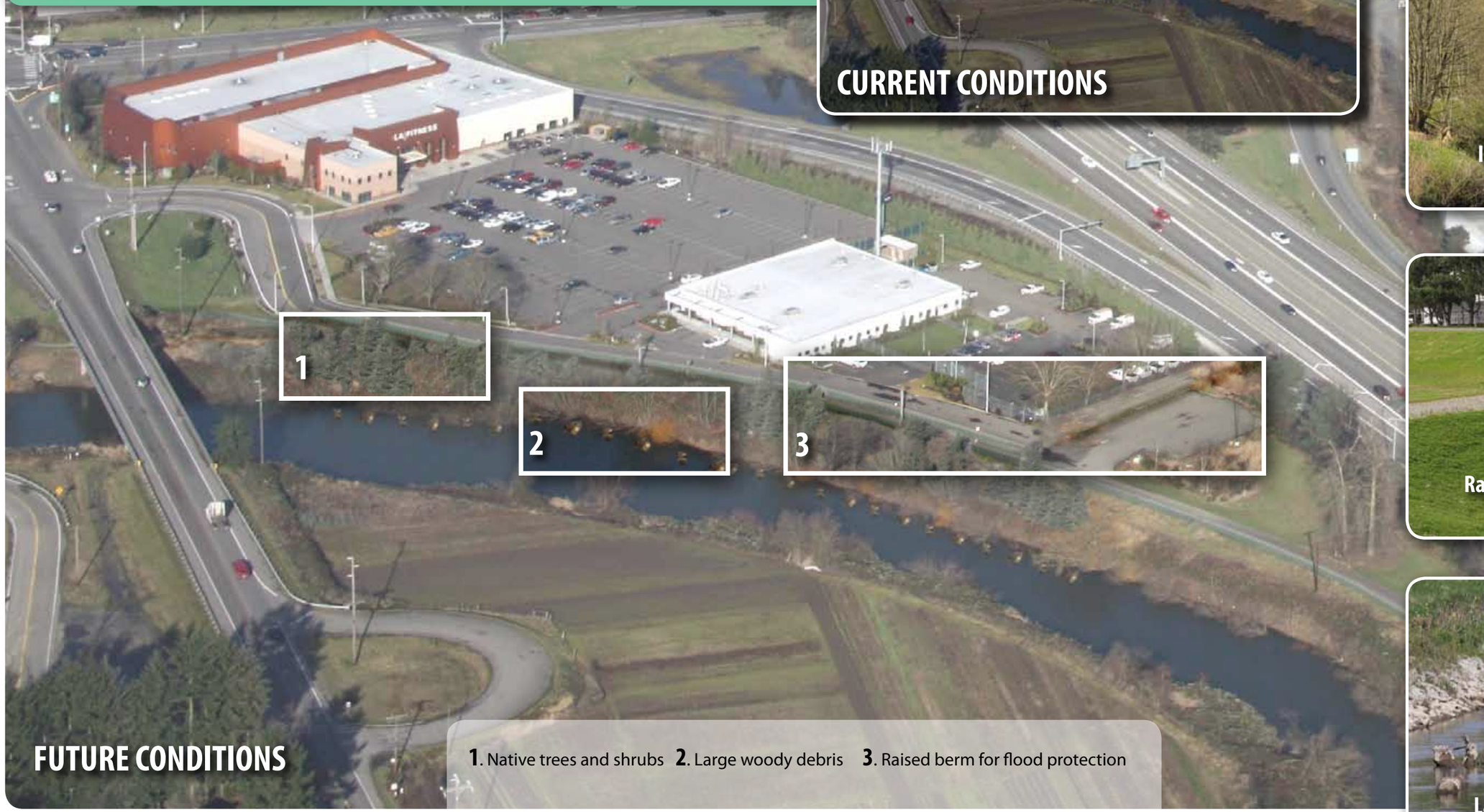
6. **Downey** Farmstead Restoration

7 **Hawley Road** Levee

8. **Riverview Park**

HAWLEY ROAD
LEVEE

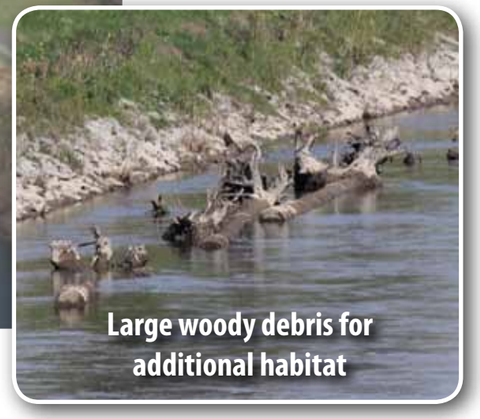
As one of the city's levee reaches with the lowest freeboard height, improvements to this levee reach will raise the levee to protect against severe flood events. The project is just north of the Riverview Park site, an exciting restoration project along the Green River.




CURRENT CONDITIONS


Installation of native trees and shrubs


Raised earthen berm for flood protection


Large woody debris for additional habitat

1. Native trees and shrubs **2**. Large woody debris **3**. Raised berm for flood protection

GREEN RIVER PROJECTS

RIVERVIEW PARK

Riverview Park Project Description:

Operating presently as a passive use park with a large open area for model airplane, kite flying, and informal fishing access to the Green River, the Riverview Park Channel Restoration project presents a unique opportunity to build a project that provides habitat restoration and flood storage in a key reach of the Green River where side channels are virtually non-existent.

In urbanized areas such as the Kent Valley, opportunities to build side channel habitats next to the river are very limited. Generally, private ownership and existing development adjacent to the river make side channel projects exceedingly difficult or prohibitive. Side channels along a river are an important component of salmon habitat in that they provide an area away from a river's main channel for salmon to thrive and grow, and seek refuge from predators and high flows.

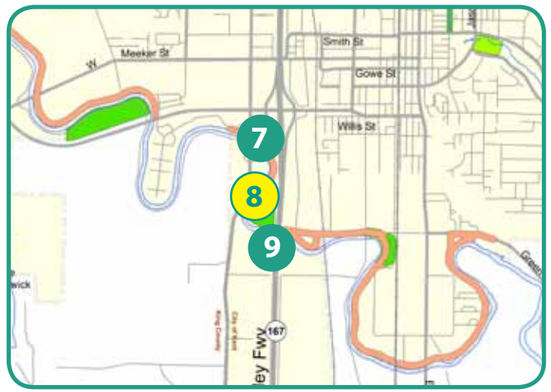
Riverview Park is owned by the City of Kent. The city was able to secure grant funds from the State Resource and Conservation Office (RCO) and from the King Conservation District for both the design and construction of the project. A partnership with the US Army Corps of Engineers (Corps) provided a majority of the project cost to be paid through the Corps' funded Green / Duwamish Ecosystem Restoration Program.

With construction starting in 2012, the Riverview Park side channel project is the culmination of a decade long partnership between the city and the Corps. The project will provide summer rearing habitat and high flow winter refuge for multiple salmon species in the Green River. The new side channel also provides flood storage during high water events. The project is a great example of the city's commitment to balancing habitat restoration for the Green River watershed and flood protection for citizens and businesses in the Kent Valley.

7. Hawley Road Levee

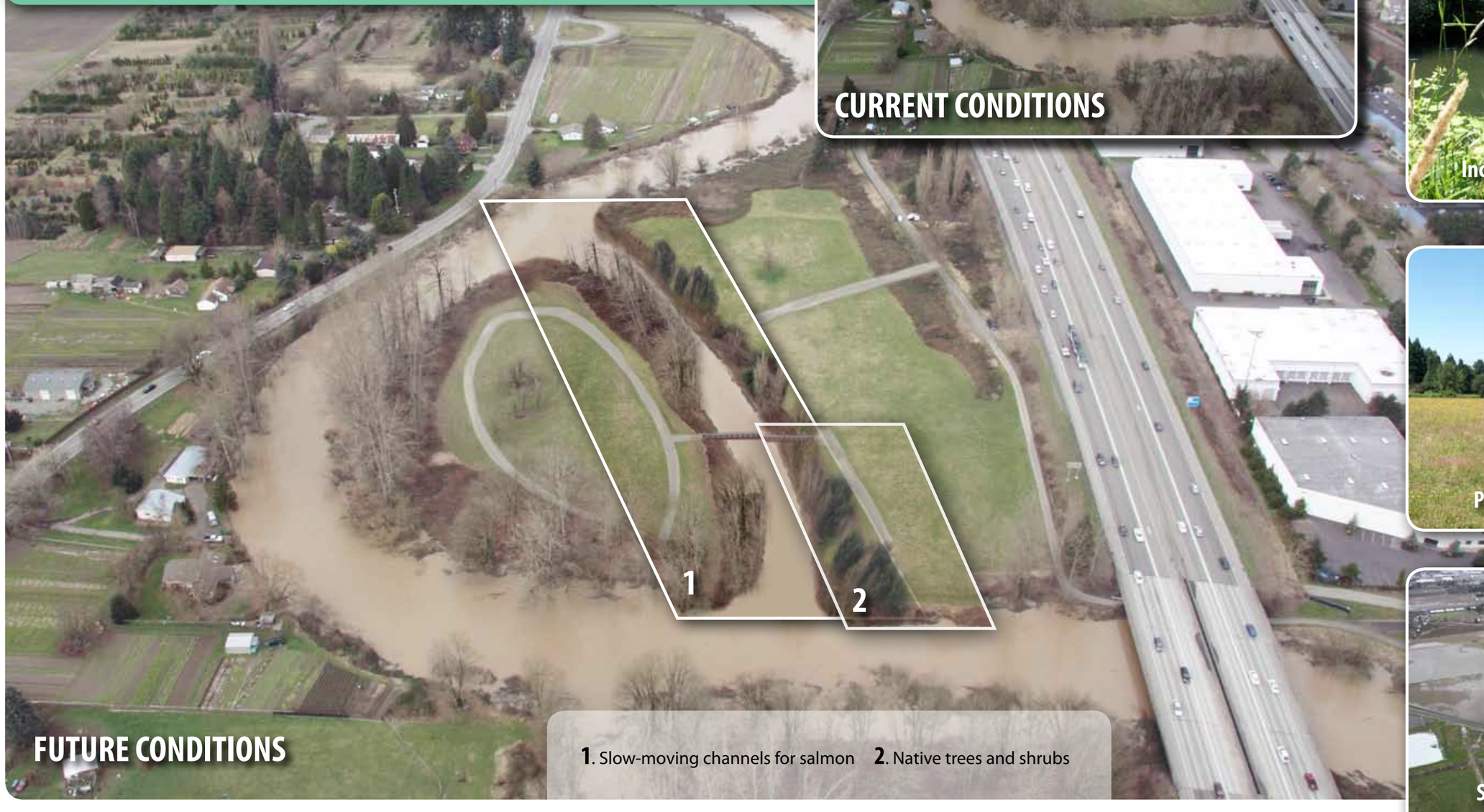
8 Riverview Park

9. Leber Homestead



RIVERVIEW PARK

The Riverview Park restoration project is part of the city's overall strategy for both salmon habitat restoration (Fig. 1) and flood control projects along the Green River. This flagship project will benefit salmon, including three ESA listed species, Chinook, Steelhead, and Bull Trout.



1. Slow-moving channels for salmon **2**. Native trees and shrubs

GREEN RIVER PROJECTS

LEBER HOMESTEAD

Leber Homestead Project Description:

The Leber Homestead project has received funding from the Washington State Recreation and Conservation Salmon Recovery Funding Board for final design and permitting to be completed by June of 2012. The project will create 55,000 square feet of underwater habitat for use by Chinook and other salmon species during peak outmigration periods and will restore floodplain functions.

The project site was purchased in 1932 by Frederick Leber from the Alvord family who owned the property since the 1860's. The site was a cherry orchard from 1936 until 1970 when the trees were cut and cleared in phases and the land was eventually overtaken by grasses and blackberries that had been planted elsewhere on the property in the 1940's.

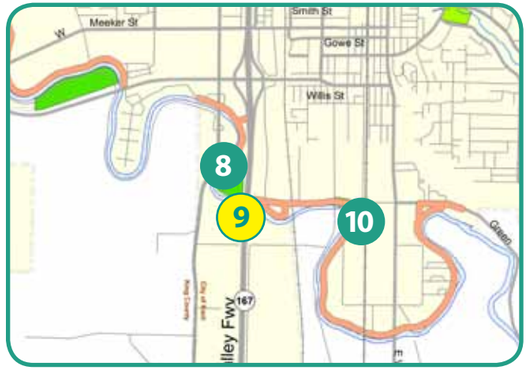
The design of the project includes excavation of over 1,000 linear feet of off-channel habitat on the right bank of Mill Creek that will restore floodplain functions. The completed project will include numerous large wood debris structures providing salmon habitat, removal of invasive vegetation and installation of native near-water and upland plantings. Existing mature trees along the banks of Mill Creek and the Green River will be preserved.

The goals of the project are to protect water quality, increase floodplain storage, protect and improve riparian vegetation and access to tributaries, and preserve, create and restore habitat that provides refuge for Chinook and other salmon species.

8. Riverview Park

9 **Leber** Homestead

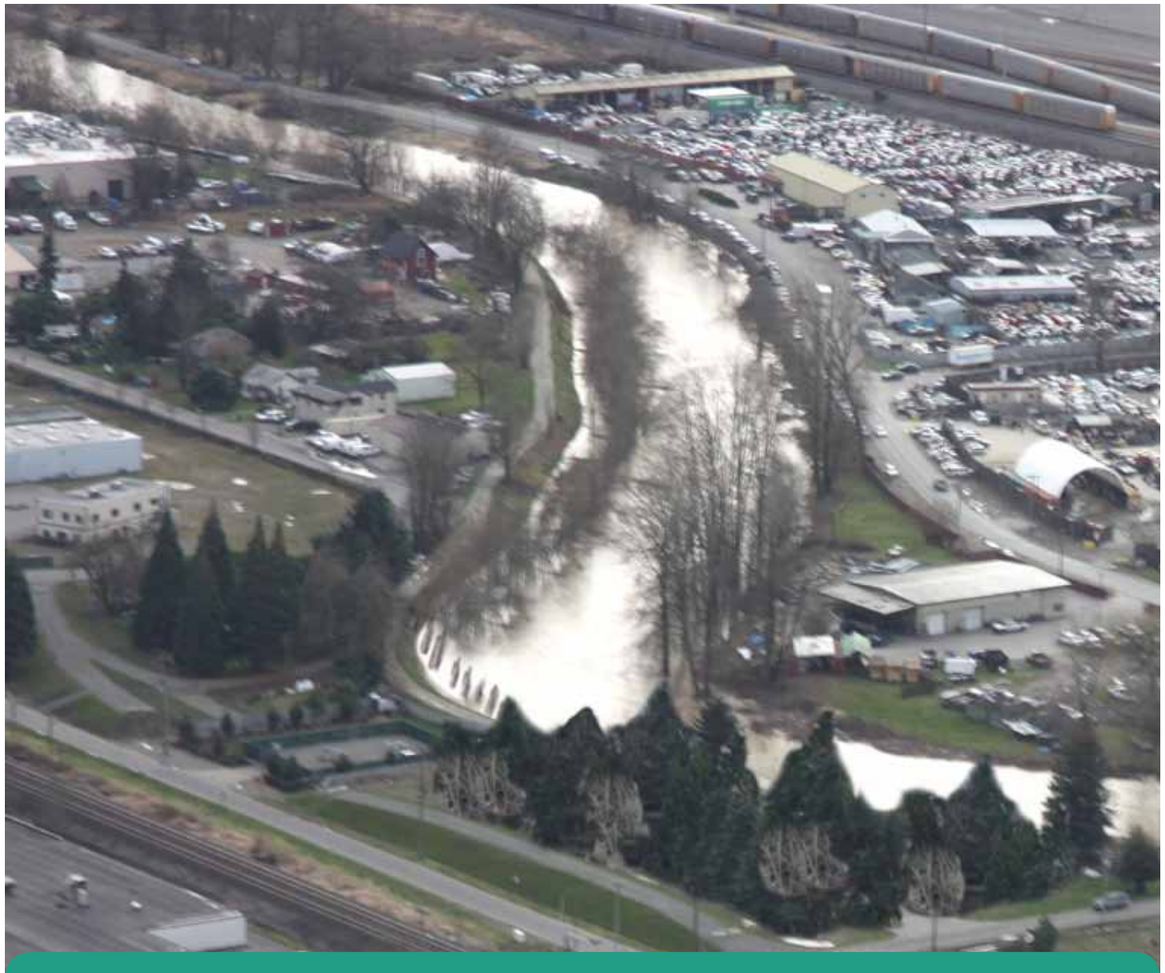
10. Horseshoe Bend
Levee



LEBER HOMESTEAD

This back channel restoration project is designed to increase flood protection capacity while restoring nearly 8.5 acres with native plantings. In addition, the channel will provide winter refuge for salmon.

1. Slow-moving channels for salmon **2**. Native shrubs and trees



GREEN RIVER PROJECTS

HORSESHOE BEND LEVEE

Horseshoe Bend Project Description:

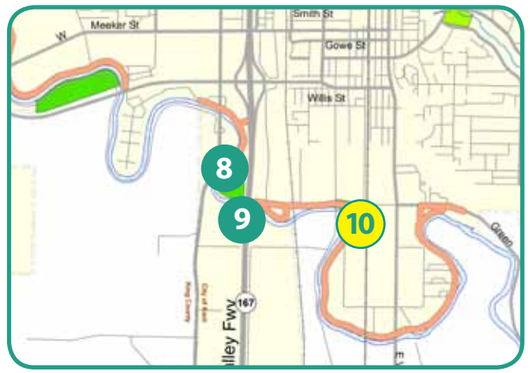
The Horseshoe Bend levee project includes analyzing and inspecting the right bank of the Green River, rebuilding or improving parts of the levee as needed, and getting the levee certified through the Federal Emergency Management Agency (FEMA). This levee section protects a large portion of the Green River Valley from flooding. Improving the levee to meet national standards will remove approximately one-third of the Kent Valley from the floodplains, and prevent the need for property owners to buy flood insurance.

Habitat improvements will be made throughout this site, most noticeably in those areas where setback levees are built. Included in the design is the planting of nearly 2.5 acres of open space. This area will be planted with native trees and shrubs, while along the riverbank, large woody debris will be installed to slow the current and provide critical salmon habitat.

8. Riverview Park

9. Leber Homestead

10 **Horseshoe Bend** Levee



HORSESHOE BEND
LEVEE

This levee reach is one of the city's most critical. It protects nearly 1/3 of the Kent Valley from flood risk. Habitat improvements along this site include plantings and large woody debris along the river's edge and enhancing more than 2.5 acres of wildlife habitat.


CURRENT CONDITIONS

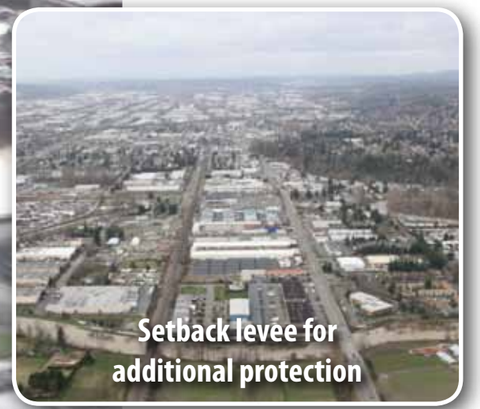

2

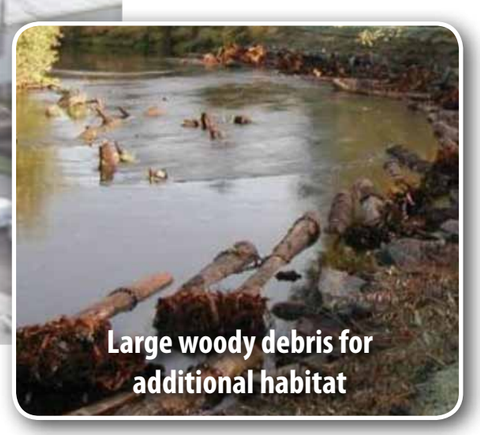

1

FUTURE CONDITIONS

1. Native trees and shrubs **2**. Large woody debris


Planting native trees and shrubs


Setback levee for additional protection


Large woody debris for additional habitat

The City of Kent is dedicated to managing flood protection for its residents, preserving and restoring natural habitat for fish and wildlife, and promoting a sustainable and vibrant local economy.

With over 12 miles of river running through the city, protection of the valley through improvements to Green River levees is of vital importance. Improving the levees to a standard that is accreditable by FEMA offers additional security to local businesses and residents, removes much of the valley from the floodplain, and no longer makes flood insurance a requirement for many properties. While meeting federal levee standards are the immediate short term goal for the City, Kent is intent on achieving a 500 year flood protection standard in the long term.

The levee and environmental enhancement projects along the Green River are phased to include the restoration of natural habitat with additional native trees and shrubs. These plantings are designed to shade the river while providing fish and wildlife with a more complex ecosystem. In many of the projects, large woody debris will be installed along the edge of the river. Riparian plantings, wood placement along the edge of the river, benched riverbanks, restoration of floodplain functions, and side channel habitat are all goals moving forward to improve salmon habitat in the Green River.

As one of the largest warehouse districts on the west coast, the Kent Valley has 90,000 jobs and a $2.8 billion payroll. A safe valley with access to healthy, open green spaces retains these businesses and promotes future job growth in the region.

The Green River projects outlined in this book exemplify the strong commitment the city of Kent has made to achieving flood protection, habitat restoration, and economic sustainability throughout the entire valley. There are many stakeholders in the Green River Valley working to achieve these goals. The City of Kent is dedicated to working collaboratively and solving regional problems with local solutions.

KENT
WASHINGTON

GREEN RIVER PROJECTS

Achieving Flood Protection, Habitat Restoration and Economic Sustainability

KENT
WASHINGTON

W05334_4_12